

ATTACHMENT 71111.05AQ

INSPECTABLE AREA: Fire Protection (Annual / Quarterly)

CORNERSTONES: Initiating Events (10%)
Mitigating Systems (90%)

INSPECTION BASES: Fire can be a significant contributor to reactor plant risk. In many cases, the risk posed by fires is comparable to or exceeds the risk from internal events. The fire protection program shall extend the concept of defense in depth (DID) to fire protection in plant areas important to safety by:

- (1) preventing fires from starting,
- (2) rapidly detecting, controlling, and extinguishing those fires that do occur, and
- (3) providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the reactor plant.

LEVEL OF EFFORT: Quarterly Inspection: The resident inspector will tour six to twelve plant areas important to reactor safety (on a plant specific basis) each calendar quarter per Section 02.01.

Annual Inspection: Each year, the resident inspector will evaluate the fire brigade performance by observing selected fire drills. Observation of the fire brigade response to an actual fire can be considered as part of the evaluation.

Identification and Resolution of Problems: Effort will include a review of licensee's problem identification and resolution of fire protection program.

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INSPECTION OBJECTIVES

01.01 The inspection team will evaluate the licensee's fire protection program from design, operational status, and material condition points of view by verifying that the licensee's program includes:

- adequate controls for combustibles and ignition sources within the plant;
- adequate fire detection and suppression capability;
- passive fire protection features in good material condition;
- adequate compensatory measures in place for out-of-service, degraded or inoperable fire protection equipment, systems or features; and

- procedures, equipment, fire barriers, and systems so that the post-fire capability to safely shut down the plant is ensured.

01.02 To assess the performance of the fire brigade.

71111.05AQ-02 INSPECTION REQUIREMENTS

02.01 Quarterly Inspection. The resident inspector will tour six to twelve plant areas important to safety (not necessarily limited to the top few contributors to overall plant fire risk) to assess the material condition of active and passive fire protection systems and features and their operational lineup and readiness. For the areas selected, as applicable, evaluate the following :

- a. Control of Transient Combustibles and Ignition Sources. Verify the following:
 1. Transient combustible materials are being controlled in accordance with the licensee's administrative control procedures.
 2. Hot work, welding, or cutting is being done in accordance with the licensee's administrative control procedures.
- b. Fire Detection Systems.

Verify the physical condition of the fire detection devices and note any that show physical damage, blockage or potential interference with functionality (see Compensatory Measures section below).
- c. Water-based Fire Suppression Systems. Verify the following:
 1. Sprinkler heads and nozzles are not obstructed by major overhead equipment (e.g., ventilation ducts).
 2. Water supply control valves to the system are open and the fire water supply and pumping capability is operable and capable of supplying the water supply demand of the system (Verify through visual observation or surveillance record).
 3. Material conditions such as mechanical damage, painted sprinkler heads, corrosion, etc. will not affect performance of the system
- d. Gaseous Fire Suppression Systems. Verify the following:
 1. Gaseous suppression system (e.g. Halon or CO₂) nozzles are not obstructed or blocked by plant equipment such that gas dispersal would be significantly impeded.
 2. Suppression agent charge pressure is within the normal band, extinguishing agent supply valves are open, and the system is in the appropriate mode.

3. Dampers/doors are unobstructed so that they will be permitted to close automatically upon actuation of the gaseous system.
 4. Room penetration seals are sealed and in good condition.
 5. Material conditions such as mechanical damage, corrosion, damage to doors or dampers, open penetrations, or nozzles blocked by plant equipment that may affect performance of the system.
- e. Manual Firefighting Equipment and Capability. Verify the following:
2. Portable fire extinguishes are provided at their designated locations in or near the area being inspected, and access to the fire extinguishers is unobstructed by plant equipment or other work related activities.
 3. The general condition of fire extinguishes is satisfactory (e.g., pressure gauge reads in the acceptable range, nozzles are clear and unobstructed, charge test records indicate testing within the normal periodicity).
 4. Fire hoses are installed at their designated locations and the general condition of hoses and hose stations is satisfactory (e.g., no holes in or chafing of the hose, nozzle not mechanically damaged and not obstructed, valve hand wheels in place).
 5. Water supply control valves to the standpipe system are open and the fire water supply and pumping capability is operable and capable of supplying the water flow and pressure demand.
 6. Access to the hose stations is unobstructed by plant equipment or work-related activities.
- f. Passive Fire Protection Features. Verify the following:
7. Electrical raceway fire barrier systems such as cable tray fire wraps, blanket material are in good condition with no cracks, gouges, or holes in the barrier material, and no gaps in the material at joints or seams, and that banding, wire tie, and other fastener pattern and spacing appears appropriate.
 2. Fire doors close without gapping (e.g. due to fire door damage from previous obstructions), and that the door latching hardware functions securely.
 3. Ventilation system fire dampers material conditions including fusible links, where applicable, to ensure unobstructed operability. For those dampers which can not be readily observed in the selected plant areas, review the licensee's surveillance efforts directed towards verifying the continuing operability of ventilation fire dampers.

4. Structural steel fire proofing, such as fibrous or concrete encapsulation, is installed in such a way that the structural steel is uniformly covered (no bare areas).
 5. Fire barrier and fire area/room/zone electrical and piping penetration seals are not missing from locations in which they appear to be needed to complete a fire barrier wall, and determine that seals appear to be properly installed and in good condition.
 6. Reactor coolant pump oil collection systems designed to collect oil leakage and spray from all potential reactor coolant pump oil system leakage points have been installed and properly maintained. (Time permitting, the actual installation should be verified during outages after work on the pumps has been completed)
- g. Compensatory Measures. Verify the following:
1. Compensatory measures are put in place by the licensee for out-of-service, degraded or inoperable fire protection equipment, systems or features (e.g. detection and suppression systems and equipment, passive fire barrier features, or safe shutdown functions or capabilities).
 2. Licensee's plans for permanent corrective actions including effectiveness in returning the equipment to service in a reasonable period of time.

02.02 Annual Inspection. During the annual observation of a fire brigade drill in a plant area important to safety, evaluate the readiness of the licensee's personnel to prevent and fight fires, including the following aspects:

- a. Protective clothing/turnout gear is properly donned.
- b. Self-contained breathing apparatus (SCBA) equipment is properly worn and used.
- c. Fire hose lines are capable of reaching all necessary fire hazard locations, the lines are laid out without flow constrictions, the hose is simulated being charged with water, and the nozzle is pattern (flow stream) tested prior to entering the fire area of concern.
- d. The fire area of concern is entered in a controlled manner (e.g., fire brigade members stay low to the floor and feel the door for heat prior to entry into the fire area of concern).
- e. Sufficient fire fighting equipment is brought to the scene by the fire brigade to properly perform their firefighting duties.
- f. The fire brigade leader's fire fighting directions are thorough, clear, and effective.

- g. Radio communications with the plant operators and between fire brigade members are efficient and effective.
- h. Members of the fire brigade check for fire victims and propagation into other plant areas.
- i. Effective smoke removal operations were simulated.
- j. The fire fighting pre-plan strategies were utilized.
- k. The licensee pre-planned the drill scenario was followed, and that the drill objectives acceptance criteria were met.

02.03 Identification and Resolution of Problems. During quarterly and annual resident inspection, verify that the licensee is identifying issues related to this inspection area at an appropriate threshold and entering them in the corrective action program. For a sample of selected issues documented in the corrective action program, verify that the corrective actions are appropriate. See Inspection Procedure 71152, "Identification and Resolution of Problems," for additional guidance.

71111.05AQ-03 INSPECTION GUIDANCE

General Guidance

For those fire protection structures, systems, and components installed to satisfy NRC requirements designed to NFPA codes and standards, the code edition in force at the time of the design and installation is the code of record to which the design is evaluated.

Deviations from the codes should be identified and justified in the FSAR or FHA. A licensee may apply the equivalency concept in meeting the provisions of the NFPA codes and standards. When the licensee states that its design "meets the NFPA code(s)" or "meets the intent of the NFPA code(s)" and does not identify any deviations from such codes, the NRC expects that the design conforms to the codes and the design is subject to inspection against the NFPA codes.

The "Authority Having Jurisdiction" as described in NFPA documents refers to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, or designee, consistent with the authority specified in 10 CFR 1.43.

The main focus of the quarterly inspections is on the material condition and operational status of fire detection and suppression systems and equipment, and fire barriers used to prevent fire damage or fire propagation. The six to twelve plant areas to be inspected should be selected on the basis of site-specific risk worksheets. See Attachment 1.

Specific Guidance

03.01 Quarterly Inspection. The resident inspector should not attempt to address all plant areas during each inspection. The routine plant tour should focus on six to twelve plant areas important to risk. The resident inspector should note transient combustibles and

ignition sources (and compare these with the limits provided in licensee administrative procedures). The resident inspector should also note the material condition and operational status (rather than the design) of fire detection and suppression systems, and fire barriers used to prevent fire damage or fire propagation.

| 03.02 Annual Inspection. No specific guidance provided.

71111.05AQ-04 RESOURCE ESTIMATE

| The resource to perform this inspection procedure is estimated to be, on average, 45
| hours per year for quarterly and annual inspection including time allocated for annual
observation of a fire drill.

71111.05AQ-05 REFERENCES

None.

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